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INDICATORS OF DOWNWARD TREND ON SAGEBRUSH-PERENNIAL GRASS RANGES GRAZED BY SHEEP IN THE SPRING AND FALL

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Indicators of downward trend in range condition are critically needed in the sound administration of range lands. An opportunity to observe and record a few of these indicators, and the sequence in which they become apparent, was afforded by a grazing study at the U. S. Sheep Experiment Station, Dubois, Idaho. In this study four pastures were overstocked with sheep approximately 25 to 30 percent. These pastures, at the beginning of the study, were good or excellent class spring-fall range having an abundance of perennial weeds and finer grasses. Topography was level to gently rolling. Grazing was typically spring and fall, with the same amount of use being made in either season.

The first signs of downward trend became evident within 3 years after the pastures were first overstocked. Listed in the order of occurrence the indicators noted on these pastures were as follows:

1. Decrease in vigor of palatable perennial weeds and finer grasses. Tailcup lupine, arrowleaf balsamroot, royal penstemon, tapertip hawksbeard, other palatable perennial weeds and such finer grasses as bluegrasses, junegrass, and threadleaf sedge were the first to show evidence of too heavy use. Shorter stems, smaller leaves, fewer flowerstalks, and smaller flowers than on adjacent less heavily grazed ranges were the early signs. Differences in color of foliage were not evident at this stage.

2. An increase in number and size of annuals such as plumeweed (bushy birdbeak), stickseed, cheatgrass, pepperweed, and woolly Indianwheat was apparent with the first signs of decreased vigor of perennial weeds and finer bunchgrasses. Since the abundance of annuals in any one year is so much influenced by abundance and distribution of precipitation it is necessary to make comparison with less heavily grazed ranges to detect the first changes attributable to downward trend.

3. Decrease in vigor of the more robust perennial bunchgrasses, such as bluebunch wheatgrass and Indian ricegrass, as indicated by shorter leaves and fewer flowerstalks followed the decrease in vigor of palatable perennial weeds. As in the case of perennial weeds, the abundance of flowerstalks and seed was a usable indicator only when more lightly used ranges were available for comparison. In many years flowerstalks are normally absent on spring-fall ranges that are being maintained or are on an upward trend.

4. Numerous young sagebrush plants became established in the openings between mature sagebrush bushes. In other locations or in other years these young plants may or may not become established soon after the range begins to go downward. In this case at the Sheep Station the first year of the experiment happened to be a good year for the production of sagebrush seed and the second year a favorable one for germination and survival of young plants. Consequently, the young plants became established rather early. In general several seasons are likely to elapse before numerous young plants become established. A few young sagebrush plants, less than 1 per 100 square feet, are normal on most sagebrush-perennial grass ranges and should not be regarded as indicative of downward trend.

5. Death of portions of perennial weed and bunchgrass clumps. Parts of tailcup lupine and royal penstemon clumps died and bunches of ricegrass and bluebunch wheatgrass split up as overgrazing was continued. Entire plants of such perennial weeds as balsamroot and tapertip hawksbeard and smaller plants of the bunchgrasses also died out.

6. Excessive pedestaling of bunchgrasses on slopes or on less favorable sites, such as shallow rocky outcrops or south and southwest exposures next became apparent. The rapidity with which this indicator becomes apparent in other places depends upon how subject the site is to wind and water erosion. If soils are readily erosible, or slopes steep, pedestaling may become apparent earlier than on less readily eroded soils.

The foregoing indicators apply primarily to good or excellent sagebrush-grass ranges. On poorer ranges the palatable perennial weeds are likely to have disappeared. Consequently, indicators of downward trend for those poorer ranges will hinge largely on condition of the bunchgrasses and not include those revolving around growth and reproduction of the desirable perennial weeds.

These indicators on steep sloping lands and less stable soils, where chances for erosion are great, should be supplemented by indicators of lack of soil stability (see Ellison and Croft, Research Paper No. 6).

Weights of ewes and lambs kept on these pastures have so far failed to show that the range is being overstocked even though downward trend is clearly visible from the vegetation. In the fourth year of the study ewes and lambs in the overgrazed pastures were still gaining as much as those in more lightly stocked pastures. How long it will be before the sheep clearly show less gains than those in more lightly grazed pastures can be determined only by continuing the experiments. This lag in response does indicate, however, the danger of basing judgment of condition of spring range on sheep weights. It shows clearly that spring-fall range may begin deterioration several years before sheep weights start to drop.